

CLAIMS

1. An apparatus provided with a micro or ultrafiltration filter, wherein the filter is provided with a filter housing (1) having a retentate side (3) and a permeate side (4), wherein the retentate side and the permeate side are separated from each other by filter material (2), wherein a fluid supply pipe (5) is connected to the retentate side (3) and a permeate discharge pipe (6) to the permeate side (4), wherein, in the permeate discharge pipe (6), a shut-off valve (7) operable at a high frequency is provided and wherein means (8-11) are connected to the permeate side (4) for increasing the pressure in the permeate side (4) when the said shut-off valve (7) is closed to a value which is higher than the pressure on the retentate side (3).

2. An apparatus according to claim 1, wherein the shut-off valve (7) is designed to be opened and closed periodically, wherein the shut-off valve (7) is kept in a closed position so long that a higher pressure is built up on the permeate side (4) than on the retentate side (3), such that a reversal of the fluid flow in the filter material (2) occurs, wherein the means (8-11) for increasing the pressure in the permeate side (4) are designed such that, for the rest, a reversal of flow direction of fluid volumes in pipes of the apparatus is prevented.

3. An apparatus according to claim 1 or 2, wherein the means (8-11) for increasing the pressure comprise at least one permeate circulation circuit (8) which is, on the one side, connected, by an inlet, to the permeate discharge pipe (6) at a point downstream of the shut-off valve (7) and, on the other side, by an outlet (10), to the permeate side (4) of the filter housing (1), wherein a permeate circulation pump (9) is provided in the permeate circulation circuit.

4. An apparatus according to claim 3, wherein, upstream of the outlet (10) of the permeate circulation circuit (18) and downstream of the pump (9), a restriction (11) is included in order to prevent a jerky pressure build-up.

5. An apparatus according to claim 3 or 4, wherein, in the permeate circulation circuit (8), a permeate buffer tank (12) is provided for feeding the permeate circulation pump (9) during the closed condition of the shut-off valve (7).

6. An apparatus according to any one of the preceding claims, wherein the fluid supply pipe (5) is connected to a first end (15) of the retentate side (3) of the filter housing (1), wherein a retentate circulation circuit (14) is connected to a second end (16) of the retentate side (3) of the filter housing (1), wherein an outlet (13) of the retentate circulation circuit (14) is connected to the fluid supply pipe (5), wherein a retentate circulation pump (17) is provided in a retentate circulation circuit (14), wherein the first end (15) is opposite the second end (16), such that, with a switched-on retentate circulation pump (17), a cross-flow along the filter material (2) occurs.

7. An apparatus according to claim 6, wherein the outlet (10) of the permeate circulation circuit is connected to a first end (18) of the permeate side (4) of the filter housing (1), wherein the permeate discharge pipe (6) is connected to a second end (19) of the permeate side (4) of the filter housing (1), wherein the first end (18) is opposite the second end (19), such that, on the permeate side (4) of the filter housing (1), a cross-flow along the filter material (2) occurs, wherein the cross-flow on the retentate side (3) has the same flow direction as the cross-flow on the permeate side (4).

8. An apparatus according to claim 7, wherein, in opened condition of the said shut-off valve (7), the circulation in both said circulation circuits (8, 14) is such that the pressure drop is substantially equal over the whole surface of the filter material (2).